Real-time gas identification by analyzing the transient response of capillary-attached conductive gas sensor

ABSTRACT

In this study, the ability of the Capillary-attached conductive gas sensor (CGS) in real-time gas identification was investigated. The structure of the prototype fabricated CGS is presented. Portions were selected from the beginning of the CGS transient response including the first 11 samples to the first 100 samples. Different feature extraction and classification methods were applied on the selected portions. Validation of methods was evaluated to study the ability of an early portion of the CGS transient response in target gas (TG) identification. Experimental results proved that applying extracted features from an early part of the CGS transient response along with a classifier can distinguish short-chain alcohols from each other perfectly. Decreasing time of exposition in the interaction between target gas and sensing element improved the reliability of the sensor. Classification rate was also improved and time of identification was decreased. Moreover, the results indicated the optimum interval of the early transient response of the CGS for selecting portions to achieve the best classification rates.

Keyword: Gas sensor; Transient response; Electronic nose; Feature extraction